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**VII**  
**EXPEDITION TO GUADALUPE ISLAND, MEXICO,**  
**IN 1922—No. 4<sup>1</sup>**

**MOLLUSCAN FAUNA OF THE PLEISTOCENE OF**  
**SAN QUINTIN BAY, LOWER CALIFORNIA**

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A large Pleistocene fauna from northern Lower California, at a considerable distance to the south of the well-known deposits of San Pedro and San Diego, is of interest inasmuch as it forms a step in the southward extension of our knowledge of the Tertiary and Quaternary of the west coast. In the following paper it is intended to present a list, as complete as possible, of the known Mollusca of the marine Pleistocene of San Quintin Bay, together with a discussion of the stratigraphic relations of the assemblage. Four new species are described.

The material which forms the basis of this report was secured by Dr. G. Dallas Hanna, Curator of Paleontology in the California Academy of Sciences, as a member of the 1922 expedition to Guadalupe Island. Four days were spent by him

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<sup>1</sup>The preceding numbers of this series are:

- No. 1. General Report, by G. Dallas Hanna, Proc. Calif. Acad. Sci., 4th Ser., Vol. 14, No. 12, 1925, pp. 217-275.  
No. 2. Birds and Mammals, by A. W. Anthony, Proc. Calif. Acad. Sci., 4th Ser., Vol. 14, No. 13, 1925, pp. 277-320.  
No. 3. The Coleoptera, by Frank E. Blaisdell, Sr., Proc. Calif. Acad. Sci., 4th Ser., Vol. 14, No. 14, 1925, pp. 321-343.

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in collecting. The locality has since been briefly visited by the writer, but the list of species is founded solely on the collection made by Dr. Hanna.

The writer is greatly indebted to Mrs. Ida S. Oldroyd, of Stanford University, for aid in the identification of species, and to Dr. J. P. Smith, Professor of Paleontology in that institution, for free access to the University's collections and library. Acknowledgment is due to Dr. Hanna for the collection of the material, for preparation of the figures, and for other assistance. Finally, the writer wishes to thank Mr. Leo G. Hertlein, of the Department of Paleontology, California Academy of Sciences, for helpful criticism of the manuscript.

San Quintin Bay is a shallow and tortuous inlet on the west coast of Lower California about 150 miles south of San Diego. It is surrounded by level plains, elevated but a few feet above the sea, and extending for several miles inland to the foot of the mountains. It is protected from the ocean on the west side by a chain of low hills. The geology of the immediate vicinity of the bay has been briefly outlined by Hanna<sup>2</sup> in the general report on the expedition to Guadalupe Island. The following statements are quoted from his account:

"I found it profitable to visit some low cliffs, not over 20 feet high, on the east side of the bay and just south of the village. Here I succeeded in getting a very large collection of fossil shells consisting of several thousand specimens.

"The geology in the vicinity of San Quintin is comparatively simple. In late Pleistocene the present bay was a broad indentation of the sea and ocean-living species were very abundant. Subsequent elevation raised the bottom on the east side in a broad fold. The preservation of the fossil shells is excellent, many of them retaining some of the original coloration. How far back toward the foothills this embayment extended cannot be determined but probably it went to the first terrace, the beginning of a long series of rolling hills or mesa. This terrace is said also to contain fossils, but none were secured. It is probably much older than the outcrops on the bay. The mountainous country to the east of this terrace is metamorphic, the age not having been determined.

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<sup>2</sup> Proc. Calif. Acad. Sci., 4th Ser., Vol. 14, No. 12, 1925, pp. 246-247.

"On the west side of the bay there is a chain of low volcanic cones not over 300 feet high. Lava has spread outward from these as far as the bay shore, and on top of a broad shelf of this there are other Pleistocene marine sediments, but with a different set of fossils. Among those collected were some huge *Schizothærus* clams, fully eight inches long."

The only discussion of the paleontology of these deposits, previous to this, is found in a report by Dall<sup>a</sup> on collections made at San Quintin Bay by C. R. Orcutt. The species recognized were listed, several new species were described, and brief notes were included by Orcutt on geologic and other conditions at San Quintin. While the number of species listed was relatively small, some were noted by Dall that are not recognized in the present collection; these, however, are added to the following list for the sake of completeness.

With one exception, the species obtained by Hanna were taken from a series of low cliffs of soft, fossiliferous sand on the east shore of the bay immediately to the south of the village of San Quintin (Loc. 910, Calif. Acad. Sci. coll.). The specimens of *Schizothærus nuttallii* were found at Loc. 929 (C.A.S. coll.), on the west side of the bay, directly opposite the village. Those species recorded by Dall, but not recognized in the present collection are included in the list in brackets. They were apparently taken from several points about the bay, but as all the collecting stations are very close together, and as all belong without question to one horizon, the exact localities are not here differentiated in the listing of species. The list, while large and as complete as can be made with the material at hand, is known not entirely to exhaust the fauna, for in the collection there are a number of species that can not be positively identified, and doubtless more extensive work about the bay would discover a few more forms not yet noted. Mere generic determinations of fragmentary material are omitted from the list. In addition to the Mollusca the deposits contain a few species of Bryozoa, Echinodermata, and Crustacea; also Foraminifera of many species which have not as yet been identified.

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<sup>a</sup> West American Scientist, Vol. 19, 1921, pp. 17-24.

LIST OF SPECIES OF MOLLUSCA FROM THE PLEISTOCENE OF  
SAN QUINTIN BAY, L. C.

PELECYPODA

- |   |  |
|---|--|
| <i>Nucula exigua</i> Sowerby              | <i>Cardium quadrigenarium</i> Conrad       |
| <i>Leda acuta</i> Conrad                  | <i>Cardium substriatum</i> Conrad          |
| [ <i>Leda oxia</i> Dall]                  | <i>Dosinia ponderosa</i> Gray              |
| <i>Leda penderi</i> Dall                  | <i>Tivela stultorum</i> Mawe               |
| <i>Leda taphria</i> Dall                  | [ <i>Transenella tantilla</i> Gould]       |
| [ <i>Glycymeris corteziana</i> Dall]      | <i>Amiantis callosa</i> Conrad             |
| [ <i>Glycymeris multicostata</i> Sowerby] | [ <i>Macrocallista aurantiaca</i> Sowerby] |
| <i>Arca multicostata</i> Sowerby          | <i>Pitaria newcombiana</i> Gabb            |
| <i>Ostrea lurida</i> Carpenter            | <i>Saxidomus nuttallii</i> Conrad          |
| [ <i>Ostrea megodon</i> Hanley]           | <i>Chione succincta</i> Valenciennes       |
| <i>Pecten cataractes</i> Dall             | <i>Paphia staminea</i> Conrad              |
| <i>Pecten circularis</i> Sowerby          | <i>Paphia staminea laciniata</i> Carpenter |
| <i>Pecten latiauritus</i> Conrad          | <i>Paphia tenerrima</i> Carpenter          |
| <i>Hinnites giganteus</i> Gray            | <i>Psephidia cymata</i> Dall               |
| [ <i>Lima dehiscens</i> Conrad]           | [ <i>Cooperella subdiaphana</i> Carpenter] |
| <i>Anomia peruviana</i> Orbigny           | <i>Tellina bodegensis</i> Hinds            |
| <i>Pododesmus macroschisma</i>            | <i>Tellina buttoni</i> Dall                |
| Deshayes                                  | <i>Tellina carpenteri</i> Dall             |
| <i>Mytilus californianus</i> Conrad       | [ <i>Tellina idæ</i> Dall]                 |
| <i>Modiolus modiolus</i> Linnæus          | <i>Metis alta</i> Conrad                   |
| <i>Modiolus rectus</i> Conrad             | [ <i>Macoma acolasta</i> Dall]             |
| <i>Periploma planiuscula</i> Sowerby      | <i>Macoma indentata</i> Carpenter          |
| <i>Periploma sulcata</i> Dall             | <i>Macoma nasuta</i> Conrad                |
| [ <i>Thracia quentinensis</i> Dall]       | <i>Macoma secta</i> Conrad                 |
| [ <i>Cyathodonta dubiosa</i> Dall]        | <i>Macoma yoldiformis</i> Carpenter        |
| <i>Pandora punctata</i> Conrad            | <i>Semele decisa</i> Conrad                |
| <i>Lyonsia californica</i> Conrad         | <i>Semele pulchra</i> Sowerby              |
| <i>Crassinella branneri</i> Arnold        | [ <i>Semele quentinensis</i> Dall]         |
| <i>Cardita subquadrata</i> Carpenter      | <i>Semele rubropicta</i> Dall              |
| <i>Chama buddiana</i> C. B. Adams         | <i>Cumingia densilineata</i> Dall          |
| <i>Chama pellucida</i> Sowerby            | <i>Donax californica</i> Conrad            |
| <i>Diplodonta subquadrata</i> Carpenter   | [ <i>Donax gouldii</i> Dall]               |
| [ <i>Phacoides annulatus</i> Reeve]       | <i>Sanguinolaria orcutti</i> Dall          |
| <i>Phacoides approximatus</i> Dall        | <i>Heterodonax bimaculata</i> Linnæus      |
| <i>Phacoides californicus</i> Conrad      | <i>Tagelus subteres</i> Conrad             |
| <i>Phacoides nuttallii</i> Conrad         | <i>Solen rosaceus</i> Carpenter            |
| <i>Phacoides richthofeni</i> Gabb         | <i>Solen sicarius</i> Gould                |
| [ <i>Kellia laperousii</i> Deshayes]      | [ <i>Siliqua lucida</i> Conrad]            |
| <i>Aligena cerritensis</i> Arnold         | <i>Mactra californica</i> Conrad           |
| <i>Rochefortia tumida</i> Carpenter       | <i>Mactra dolabriformis</i> Conrad         |
| [ <i>Lasæa rubra</i> Montagu]             | [ <i>Spisula camaronis</i> Dall]           |
| <i>Cardium biangulatum</i> Sowerby        | [ <i>Spisula catilliformis</i> Conrad]     |
| <i>Cardium procerum</i> Sowerby           | [ <i>Spisula longa</i> Dall]               |

<i>Spisula planulata</i> Conrad	<i>Corbula luteola</i> Carpenter
<i>Schizothærus nuttallii</i> Conrad	<i>Panope generosa</i> Gould
<i>Cryptomya californica</i> Conrad	<i>Saxicava arctica</i> Linnæus
[ <i>Cryptomya magna</i> Dall]	[ <i>Zirfæa gabbi</i> Tryon]

## SCAPHOPODA

<i>Dentalium neohexagonum</i>	Broderip & Sowerby
Pilsbry & Sharp	<i>Cadulus tolmei</i> Dall
<i>Dentalium semipolitum</i>	

## GASTROPODA

<i>Acteon punctocoelata</i> Carpenter	<i>Marcron æthiops</i> Reeve
<i>Acteon traski</i> Stearns	<i>Alectrion californiana</i> Conrad
<i>Acteocina carinata</i> Carpenter	<i>Alectrion cerritensis</i> Arnold
<i>Acteocina culcitella</i> Gould	<i>Alectrion cooperi</i> Forbes
<i>Cylichnella diegensis</i> Dall	<i>Alectrion fossata</i> Gould
<i>Bullaria gouldiana</i> Pilsbry	<i>Alectrion mendica</i> Gould
<i>Melampus olivaceus</i> Carpenter	<i>Alectrion perpinguis</i> Hinds
<i>Terebra pedroana</i> Dall	<i>Alectrion tegula</i> Reeve
<i>Terebra pedroana philippiana</i> Dall	<i>Columbella gausapata</i> Gould
<i>Conus californicus</i> Hinds	<i>Columbella tuberosa</i> Carpenter
<i>Cryptoconus tremperianus</i> Dall	<i>Amphissa versicolor</i> Dall
<i>Elæocyma arbela</i> Dall	<i>Murex festivus</i> Hinds
<i>Elæocyma hemphilli</i> Stearns	[ <i>Murex gemma</i> Sowerby]
[ <i>Clathrodrillia halcyonis</i> Dall]	<i>Purpura nuttallii</i> Conrad
<i>Clathrodrillia incisa ophioderma</i>	<i>Tritonalia foveolata</i> Hinds
Dall	<i>Tritonalia interfossa</i> Carpenter
<i>Pseudomelatoma moesta</i> Carpenter	<i>Tritonalia lurida munda</i> Carpenter
<i>Mangilia arteaga roperi</i> Dall	<i>Tritonalia poulsoni</i> Carpenter
<i>Mangilia barbarensis</i> Oldroyd	[ <i>Tritonalia squamulifera</i>
<i>Cytherea branneri</i> Arnold	Carpenter]
<i>Cytherea densilineata</i> Dall	[ <i>Acanthina lugubris</i> Sowerby]
[ <i>Cytherea quentenensis</i> Dall]	<i>Forreria belcheri</i> Hinds
<i>Olivella biplicata</i> Sowerby	<i>Epitonium acrostephanum</i> Dall
<i>Olivella boetica</i> Carpenter	<i>Epitonium fallaciosum</i> Dall
<i>Olivella pedroana</i> Conrad	<i>Epitonium tinctum</i> Carpenter
<i>Olivella porteri</i> Dall	<i>Melanella berryi</i> Bartsch
<i>Marginella californica</i> Tomlin	<i>Melanella draconis</i> Bartsch
<i>Marginella jewettii</i> Carpenter	<i>Melanella lastra</i> Bartsch
<i>Marginella oldroydæ</i> Jordan, n. sp.	<i>Melanella loleta</i> Jordan, n. sp.
<i>Marginella regularis</i> Carpenter	<i>Melanella micans</i> Carpenter
<i>Cypræolina pyriformis</i> Carpenter	<i>Melanella oldroydi</i> Bartsch
<i>Strigatella catalinæ</i> Dall	<i>Melanella rutila</i> Carpenter
<i>Mitromorpha aspera</i> Carpenter	<i>Melanella thersites</i> Carpenter
<i>Mitromorpha filosa</i> Carpenter	<i>Turbonilla (Turbonilla) gilli</i>
<i>Kellettia kellettii</i> Forbes	Dall & Bartsch

- Turbonilla (Strioturbonilla) asser*  
 Dall & Bartsch  
*Turbonilla (Strioturbonilla) attrita*  
 Dall & Bartsch  
*Turbonilla (Strioturbonilla) stylina*  
 Carpenter  
*Turbonilla (Pyrgolampros) gloriosa*  
 Bartsch  
*Turbonilla (Pyrgolampros) gouldi*  
 Dall & Bartsch  
*Turbonilla (Pyrgiscus) almo*  
 Dall & Bartsch  
*Turbonilla (Pyrgiscus) antestriata*  
 Dall & Bartsch  
*Turbonilla (Pyrgiscus) hertleini*  
 Jordan, n. sp.  
*Turbonilla (Pyrgiscus) tenuicula*  
 Gould  
*Turbonilla (Pyrgiscus) vexativa*  
 Dall & Bartsch  
*Turbonilla (Mormula) catalinensis*  
 Dall & Bartsch  
*Turbonilla (Bartschella) laminata*  
 Carpenter  
*Odostomia (Chrysallida) dallasi*  
 Jordan, n. sp.  
*Odostomia (Ividella) navisa del-*  
*montensis* Dall & Bartsch.  
*Odostomia (Ividella) pedroana*  
 Dall & Bartsch  
*Odostomia (Iolæa) eucosmia*  
 Dall & Bartsch  
*Odostomia (Evalea) minutissima*  
 Dall & Bartsch  
 [Trivia californiana Gray]  
*Erato columbella* Menke  
*Bursa californica* Hinds  
 [Cymatium vestitum Hinds]  
*Triphora catalinensis* Bartsch  
*Triphora pedroana* Bartsch  
*Triphora stearnsi* Bartsch  
*Cerithiopsis alcima* Bartsch  
*Cerithiopsis antefilosa* Bartsch  
*Cerithiopsis diegensis* Bartsch  
*Cerithiopsis grippi* Bartsch  
*Cerithiopsis halia* Bartsch  
*Cerithiopsis montereyensis* Bartsch  
*Seila montereyensis* Bartsch  
*Bittium interfossa* Carpenter  
*Bittium rugatum* Carpenter  
*Cerithidea californica* Haldeman  
*Cæcum californicum* Dall  
*Cæcum dalli* Bartsch  
*Micranellum crebricinctum*  
 Carpenter  
*Micranellum pedroënse* Bartsch  
*Fartulum bakeri* Bartsch  
*Fartulum hemphilli* Bartsch  
*Fartulum occidentale* Bartsch  
*Aletes squamigerus* Carpenter  
*Vermiculum anellum* Mörch  
*Petalocochnus complicatus* Dall  
 [Turritella cooperi Carpenter]  
*Turritella jewetti* Carpenter  
*Turritellopsis acicula stimpsoni* Dall  
*Tachyrhynchus lacteolus subplana-*  
*tus* Carpenter  
*Littorina scutulata* Gould  
*Lacuna unifasciata* Carpenter  
*Alaba catalinensis* Bartsch  
*Alaba jeanetta* Bartsch  
*Barleeia bentleyi*, Bartsch  
*Barleeia dalli* Bartsch  
*Alvania æquisculpta* Keep  
*Alvania pedroana* Bartsch  
*Alvania purpurea* Dall  
*Truncatella californica* Pfeiffer  
*Truncatella stimpsoni* Stearns  
*Syncera translucens* Carpenter  
*Hipponix tumens* Carpenter  
*Crepidula excavata* Broderip  
*Crepidula lessoni* Broderip  
*Crepidula lingulata* Gould  
*Crepidula nummaria* Gould  
*Crucibulum spinosum* Sowerby  
*Polinices lewisii* Gould  
*Polinices reclusiana* Deshayes  
*Phasianella compta* Gould  
*Phasianella pulloides* Carpenter  
*Phasianella substriata* Carpenter  
*Phasianella typica* Dall  
*Astræa undosa* Wood  
*Leptothyra carpenteri* Pilsbry  
*Leptothyra paucicostata* Dall  
*Norrisia norrisii* Sowerby  
*Tegula aureotincta* Forbes

<i>Tegula gallina</i> Forbes	[ <i>Turcica coffea</i> Gabb]
<i>Tegula ligulata</i> Menke	<i>Vitrinella eshnauri</i> Bartsch
[ <i>Tegula regina</i> Stearns]	<i>Vitrinella stearnsi</i> Bartsch
<i>Calliostoma canaliculatum</i> Martyn	<i>Cyclostremella californica</i> Bartsch
<i>Calliostoma gloriosum</i> Dall	<i>Megatebennus bimaculatus</i> Dall
[ <i>Calliostoma lima</i> Philippi]	<i>Diadora aspera</i> Eschscholtz
<i>Calliostoma tricolor</i> Gabb	

## AMPHINEURA

<i>Callistochiton decoratus</i> Carpenter	<i>Callistochiton palmulatus mirabilis</i> Pilsbry
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The composition of the above fauna indicates that it is of upper Pleistocene age. It cannot be lower Pleistocene or upper Pliocene as suggested by Dall.<sup>4</sup> Of the 255 species in the list, only 13, or about 5 per cent, are not known to be living today. Several of these are closely allied to recent forms, and our knowledge of the present day fauna of Lower California is not sufficiently complete to assume that a few others will not eventually be found in the living state. While the assemblage is essentially similar to the recent fauna of southern California and of Lower California north of Cedros Island, there are in the list a number of characteristically tropical types that do not now live in the waters about San Quintin, but are found living only in considerably warmer regions. Such species as *Glycymeris multicostata* Sby.; *Ostrea megodon* Hanl.; *Pecten cataractes* Dall; *Cardium procerum* Sby.; *Macrocallista aurantiaca* Sby.; *Macron æthiops* Rve.; *Cymatium vestitum* Hds., and certain of the smaller gastropods are true residents of the Gulf of California, and of Lower California to the south of Cedros Island. Their appearance in the fauna indicates that the climate during the time of deposition of the beds at San Quintin was notably warmer than it is at present in the region.

It has been proved by Arnold,<sup>5</sup> and again brought out by J. P. Smith,<sup>6</sup> that, on the basis of contrasting faunas dependent upon climatic changes, two distinct horizons may be recognized in the Pleistocene of San Pedro. The older, known as the Lower San Pedro, contains a coldwater fauna, of which

<sup>4</sup>West American Scientist, Vol. 19, 1921, pp. 17 and 21.

<sup>5</sup>Mem. Calif. Acad. Sci., Vol. 3, 1903, pp. 20 and 29.

<sup>6</sup>Proc. Calif. Acad. Sci., Ser. 4, Vol. 9, No. 4, 1919, pp. 136-137.



many species now live only to the north of that district. The younger, or Upper San Pedro, contains a subtropical fauna, of which many species are today confined to the coast of Lower California, and to the Gulf. During the lower Pleistocene, then, as likewise in the uppermost Pliocene,<sup>7</sup> the climate of western North America was distinctly cooler than it is at present, while later in the Pleistocene it became warmer than today.

The deposits at San Quintin, containing a fauna with several warmwater elements in a latitude where quite such a fauna no longer exists, are, therefore, to be placed in the Upper Pleistocene, as an approximate though more southern equivalent of the Upper San Pedro. In addition to the evidence deduced from climatic relations, there remains in support of such correlation the fact that, with a few exceptions, the species occurring at San Quintin are also common to the Upper San Pedro, and far fewer of them are found in older formations.

#### 1. *Cumingia densilineata* Dall

Plate XXV, figures 1, 3, 5

*Cumingia densilineata* Dall, West American Scientist, Vol. 19, 1921, p. 22; Proc. U. S. Nat. Mus., Vol. 66, 1925, p. 15, pl. 8, fig. 5; pl. 11, fig. 2.

The original description is as follows:

"Shell subtriangular, equivalve, nearly equilateral, inflated, rounded in front, acutely rostrate behind; beaks inconspicuous, nearly central; surface regularly closely concentrically, minutely lamellose, the wider interspaces faintly radially striated; hinge normal, well developed; pallial sinus deep, low, almost entirely coalescent with the pallial line below; length, 29; height, 20; diameter, 12 mm.

"This differs from all the figured species, and especially the Californian recent species, by its close and regular sculpture and the straightness with which the upper and lower margins converge toward the posterior end."

The species was described from the Pleistocene of San Quintin Bay.

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<sup>7</sup> See Arnold, loc. cit., p. 16; Smith, loc. cit., p. 151.



There are nine specimens in the collection agreeing with the above description, and differing from the living *Cumingia lamellosa* Sowerby in the characters enumerated by Dall. These also have a thinner and more delicate shell than any other specimens examined of the recent species.

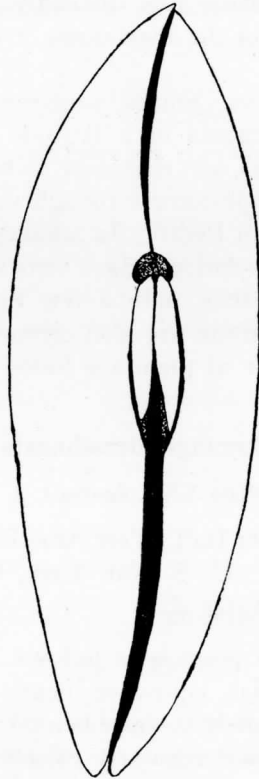


Fig. 1. *Sanguinolaria orcutti* Dall; dorsal view.

## 2. *Sanguinolaria orcutti* Dall

Text figure 1

*Sanguinolaria* (*Nuttallia*) *orcutti* Dall, West American Scientist, Vol. 19, 1921, p. 17; Proc. U. S. Nat. Mus., Vol. 66, 1925, p. 26, pl. 12, figs. 1, 2.

The original description is as follows:

"Shell large, thin, inequivalve, inequilateral, externally smooth except for incremental lines; left valve inflated, the

right valve flattish; hinge formula  $\frac{L10101}{R01010}$ ; ligament long and strong on prominent nymphs; anterior adductor scar elongate, narrow; posterior scar reniform, large; pallial sinus subtriangular, reaching slightly in front of the vertical from the beaks, almost wholly coalescent with the pallial line below; valve margins thin, smooth, the valves slightly patulous behind. Length of shell, 130; height, 95; diameter of left valve, 22; of right valve, 13; beaks behind the anterior end, 47 mm.

"This shell is undoubtedly the ancestor of the much smaller *S. nuttallii* Conrad, which, except in size and minor details of hinge, outline and pallial sinus, it closely resembles. The anterior cardinal in the fossil is very feeble, in the recent species it has vanished altogether."

The species was described from the Pleistocene of San Quintin Bay.

This large clam is exceedingly abundant throughout the deposit. Young examples can hardly be discriminated from *S. nuttallii*, but the living species never approaches the fossil in size.

### 3. *Marginella oldroydæ* E. K. Jordan, new species

Plate XXV, figure 7

Shell minute, smooth and polished, evenly egg-shaped, not pyriform, the greatest width only slightly posterior to the middle; spire of about two and one-half whorls, low and broad, but evident and not covered by enamel; nucleus very small; suture appressed, not distinct; outer lip evenly rounded, not flattened, slightly thickened in the middle, internally smooth; inner lip with five rather sharp plaits including that at edge of pillar, these regularly decreasing in size posteriorly. Length, 3.21 mm.; maximum width, 2.00 mm.

*Type:* No. 1846, *paratypes* Nos. 1847 and 1848, Mus. Calif. Acad. Sci., from Loc. 910 (C.A.S. coll.), **San Quintin Bay, Lower California**, Pleistocene; G. D. Hanna, collector. This

little shell is not identical with any of the figured *Marginellidæ* from western America, and apparently cannot be identified with any of the species recently described, without illustration, by Dall. The evenly egg-shaped form, the low but uncovered spire, and the presence of five plaits on the inner lip are distinguishing characters.

The species is named in honor of Mrs. Ida S. Oldroyd, to whom the writer is much indebted.

#### 4. *Melanella loleta* E. K. Jordan, new species

Plate XXV, figure 6

Shell small, rather broadly conic, smooth, brilliantly polished; spire of about eight, slightly inflated and rounded post-nuclear whorls that enlarge rapidly anteriorly; sutures slightly impressed; periphery of last whorl moderately inflated, smoothly rounded; base very short, rounded; aperture broadly ovate; outer lip thick but sharp-edged, shallowly sinuate close to junction with preceding whorl, slightly protracted just anterior to periphery, and again slightly retracted at junction with basal lip; junction of basal and inner lips slightly protracted; inner lip short, nearly straight, strongly reflected and appressed to the base posteriorly; parietal wall covered by a rather thin callus. Length, 3.69 mm.; width, 1.77 mm.

*Type:* No. 1849, *paratypes* Nos. 1850 and 1851, Mus. Calif. Acad. Sci., from Loc. 910 (C.A.S. coll.), **San Quintin Bay, Lower California**, Pleistocene; G. D. Hanna, collector.

Another specimen was also examined from the same locality.

The more broadly conic form, slightly inflated whorls, and shorter base of this species distinguish it from other west American *Melanellas*. In outline it recalls certain species of *Sabinella* Monterosato, but the inner lip is not of the character common to the latter genus.

5. *Turbonilla (Pyrgiscus) hertleini* E. K. Jordan, new species

Plate XXV, figure 2

Shell elongate conic; fairly thick and solid; nuclear whorls and all but last nine-and-one-half post-nuclear whorls decol-lated; remaining post-nuclear whorls flattened in the middle, forming a straight-sided spire; sutures moderately constricted, rather sharply marked; axial ribs 20 on the last whorl, strong, slightly protractively slanting, regular, well rounded, and nearly equal to the intercostal spaces in width; intercostal spaces well marked, crossed by about 13 unequal and unequally spaced incised spiral grooves, of which the second, fifth, and eighth are much the strongest, forming deep squarish pits, and the first, and the tenth to thirteenth are the weakest; periphery of last whorl well rounded, crossed by feeble continuations of the axial ribs which evanesce before they reach the middle of the base, and marked by a spiral row of deep squarish pits, that, however, do not quite appear on the anterior portion of the whorls of the spire; bottoms of peripheral pits very delicately spirally striate; base rather short, well rounded, sculptured by continuations of the axial ribs, and by seven subequal and subequally spaced lightly impressed spiral lines, the first of which is considerably anterior to the peripheral row of pits; aperture broadly oval; outer lip thick, not showing the external sculpture within, broken in type specimen; inner lip with a feeble oblique fold a little anterior to its intersection; parietal wall covered by a thin callus. Length, 6.40 mm.; width, 1.74 mm.

*Type:* No. 1852, *paratypes* Nos. 1853, 1854, and 1855, Mus. Calif. Acad. Sci., from Loc. 910 (C.A.S. coll.), **San Quintin Bay, Lower California**, Pleistocene; G. D. Hanna, collector.

Nine other specimens were also examined from the same locality.

*Turbonilla hertleini* is closely related to a number of previously described forms, but minor details of sculpture, constant in all the specimens examined, differentiate it. This species is named for Mr. Leo G. Hertlein, whose work has contributed greatly to knowledge of the paleontology of Lower California.

6. *Odostomia* (*Chrysallida*) *dallasi* E. K. Jordan, new species

Plate XXV, figure 4

Shell elongate ovate, fairly solid; nuclear whorls of moderate size, obliquely immersed in the first of the succeeding turns; post-nuclear whorls six, rather flat, considerably contracted at the sutures and narrowly shouldered at the summit, crossed by retractive axial ribs, of which 20 occur on the penultimate turn; spiral sculpture of four sharp keels, about equal to the axial ribs in strength, and rendering them strongly nodulous at their intersection; axial ribs and spiral keels enclosing deep, nearly round pits; periphery of last whorl marked by a groove equal in strength to those separating the spiral keels between the sutures, and crossed by continuations of the axial ribs which terminate at the posterior edge of the first basal cord and render it slightly nodulous; base of last whorl well rounded, marked by six or seven unequal and unequally spaced spiral cords, of which the first, second, and fourth are the strongest; the third is very weak, or practically obsolete, leaving a broad, flat channel between the second and fourth, and the cords anterior to the fourth rapidly decrease in strength toward the umbilical area; spaces between the basal cords crossed by numerous slender axial threads; aperture oval; outer lip showing the external sculpture within; columella decidedly reflected anteriorly, provided with a strong fold at its intersection. Length, 3.72 mm.; width, 1.67 mm.

*Type*: No. 1856, *paratypes*, Nos. 1857, 1858, 1859, and 1860, Mus. Calif. Acad. Sci., from Loc. 910 (C.A.S. coll.), **San Quintin Bay, Lower California**, Pleistocene; G. D. Hanna, collector.

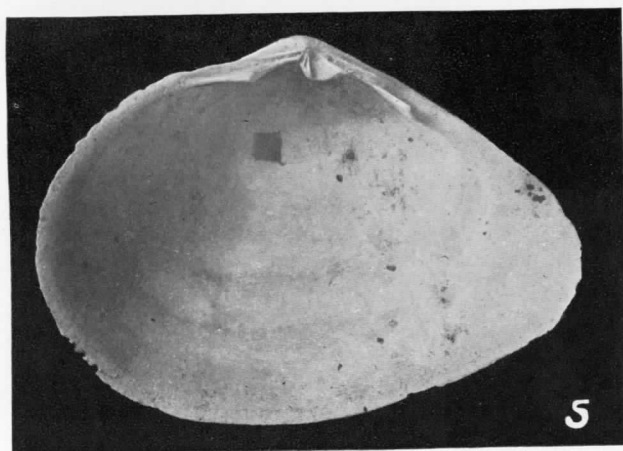
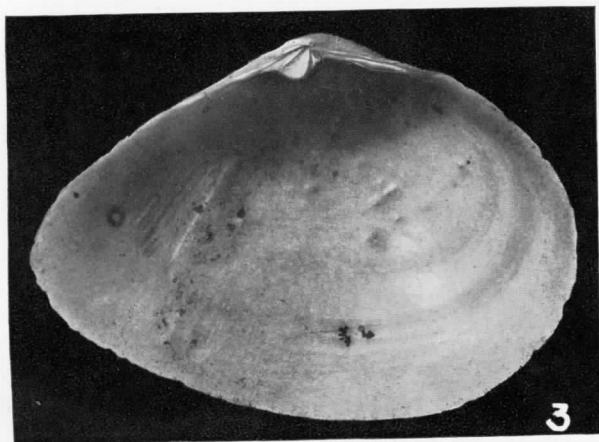
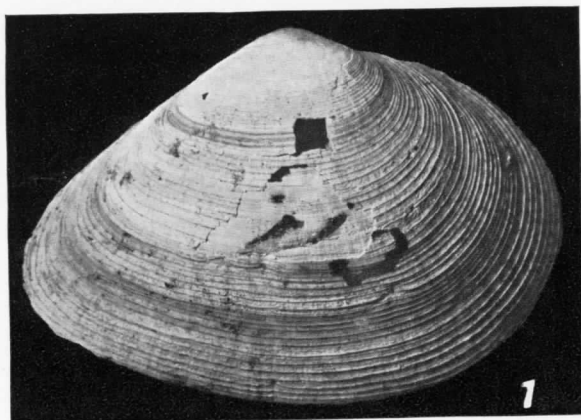
Nine other specimens were examined from the same locality.

*Odostomia dallasi* is close to *O. nodosa* Carpenter, and to several other related species, but it is distinguished by the sculpture of the base, which is constant in all of the specimens examined, and which is different from that of any previously described form.

Named for Dr. G. Dallas Hanna.

## PLATE 25

- Fig. 1. *Cumingia densilineata* Dall; length 23.0 mm.; plesiotype, right valve, No. 1845, Mus. Calif. Acad. Sci., from Loc. 910 (C.A.S. coll.), San Quintin Bay, Lower California. Pleistocene.
- Fig. 2. *Turbonilla (Pyrgiscus) hertleini* E. K. Jordan, new species; length 6.40 mm.; type, No. 1852, Mus. Calif. Acad. Sci., from Loc. 910 (C.A.S. coll.), San Quintin Bay, Lower California. Pleistocene.
- Fig. 3. *Cumingia densilineata* Dall; plesiotype, left valve, same specimen as fig. 1.
- Fig. 4. *Odostomia (Chrysallida) dallasi* E. K. Jordan, new species; length 3.72 mm.; type, No. 1856, Mus. Calif. Acad. Sci., from Loc. 910 (C.A.S. coll.), San Quintin Bay, Lower California. Pleistocene.
- Fig. 5. *Cumingia densilineata* Dall; plesiotype, right valve, same specimen as Fig. 1.
- Fig. 6. *Melanella loleta* E. K. Jordan, new species; length 3.69 mm.; type, No. 1849, Mus. Calif. Acad. Sci., from Loc. 910 (C.A.S. coll.), San Quintin Bay, Lower California. Pleistocene.
- Fig. 7. *Marginella oldroydæ* E. K. Jordan, new species; length 3.21 mm.; type, No. 1846, Mus. Calif. Acad. Sci., from Loc. 910 (C.A.S. coll.), San Quintin Bay, Lower California. Pleistocene.





## PLATE 25

- Fig. 1. *Cumingia densilineata* Dall; length 23.0 mm.; plesiotype, right valve, No. 1845, Mus. Calif. Acad. Sci., from Loc. 910 (C.A.S. coll.), San Quintin Bay, Lower California. Pleistocene.
- Fig. 2. *Turbonilla (Pyrgiscus) hertleini* E. K. Jordan, new species; length 6.40 mm.; type, No. 1852, Mus. Calif. Acad. Sci., from Loc. 910 (C.A.S. coll.), San Quintin Bay, Lower California. Pleistocene.
- Fig. 3. *Cumingia densilineata* Dall; plesiotype, left valve, same specimen as fig. 1.
- Fig. 4. *Odostomia (Chrysallida) dallasi* E. K. Jordan, new species; length 3.72 mm.; type, No. 1856, Mus. Calif. Acad. Sci., from Loc. 910 (C.A.S. coll.), San Quintin Bay, Lower California. Pleistocene.
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- Fig. 7. *Marginella oldroydæ* E. K. Jordan, new species; length 3.21 mm.; type, No. 1846, Mus. Calif. Acad. Sci., from Loc. 910 (C.A.S. coll.), San Quintin Bay, Lower California. Pleistocene.